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REMARKS

Claims 1-42 are currently pending in the subject application and are presently under consideration. Favorable consideration of the subject patent application is respectfully requested in view of the comments herein.

I. Rejection of Claims 1-4, 6, 10, 21 and 22 Under 35 U.S.C. §102(b)

Claims 1-4, 6, 10, 21 and 22 stand rejected under 35 U.S.C. §102(b) as being anticipated by Irvin (US 5,742,500). Withdrawal of this rejection is respectfully requested for at least the following reasons. Irvin fails to teach or suggest each and every limitation set forth in the subject claims.

A single prior art reference anticipates a patent claim only if it expressly or inherently describes *each and every limitation set forth in the patent claim*. *Trintec Industries, Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292, 63 USPQ2d 1597 (Fed. Cir. 2002); *See Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The *identical invention must be shown in as complete detail as is contained in the ... claim*. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The invention as claimed relates to a system and method for controlling a motorized system which provides for optimized process performance according to one or more performance criteria, such as efficiency, component life expectancy, safety, emissions, noise, vibration and operational cost. In addition, the claimed invention provides for controlling a motorized system according to a set point, operating limits, and a diagnostic signal, wherein the diagnostic signal is related to a diagnosed operating condition in the system. Thus, applicants' claimed invention provides for controlled operation of motors and motorized systems, wherein operation thereof takes into account desired process performance, such as control according to a process setpoint, as well as one or more other performance characteristics or metrics, related to the motorized system and/or component devices therein, whereby improvements in efficiency and other performance characteristics may be realized within allowable process and machinery operating constraints. To this end, independent claim 1 recites *selecting a desired*

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operating point within an allowable range of operation about a system setpoint according to performance characteristics associated with a plurality of components in the system, and automatically controlling the system according to the desired operating point. Irvin fails to teach or suggest these novel features of the claimed invention.

Irvin relates to control systems and methods for pumping wastewater. The Examiner indicates that the substance of the subject claim may be found at col. 1, lines 42-54, which states:

The control apparatus and methods used in pumping stations are generally focused on maintaining desired operating conditions reliably, but without specifically addressing or even calculating operating efficiencies and/or costs. For example, in a typical wastewater lift station one pump is turned on when the water in the wet well reaches a preset "pump start" level and is turned off at a preset (lower) "pump stop" level. If the pump has a variable-speed drive, the pump is initially activated at a preset "start speed" that is less than 100% of the pump's rated speed. The pumps, control levels, and control speeds are usually chosen such that the starting pump outflow exceeds the average inflow, and therefore the wet-well level begins to fall as soon as the pump is activated.

As is clearly evident from the above quoted passage, none of the limitations that form the substance of the subject claim are elucidated therein. The Examiner asserts that col. 1, lines 50-51, i.e. "the pump is initially activated at a preset "start speed" that is less than 100% of the pump's rated speed," discloses: *selecting a desired operating point within an allowable range of operation about a system setpoint*. However, applicants' representative contends that col. 1, lines 50-51, fails to disclose selecting an operating point within a range of allowable operating points that allows operation of the entire motorized system around a predetermined system setpoint. Rather it is apparent that col. 1, lines 50-51, discloses initially activating a pump at a preset start speed at a speed less than 100% of an individual pump's rated speed. No mention is made of selecting a desired operating point within an allowable range of operating points around a system setpoint that is dictated by a plurality of components in the system.

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The Examiner also contends that col. 1, lines 49-54, discloses selecting operating points around a system setpoint *according to the performance characteristics associated with a plurality of components in the system*. However, col. 1, lines 49-54 states:

If the pump has a variable-speed drive, the pump is initially activated at a preset "start speed" that is less than 100% of the pump's rated speed. The pumps, control levels, and control speeds are usually chosen such that the starting pump outflow exceeds the average inflow, and therefore the wet-well level begins to fall as soon as the pump is activated.

Applicants' representative asserts that col. 1, lines 49-54, does not teach or suggest selecting operating points around a system setpoint based on the performance characteristics associated with a plurality of other components that comprise the motorized system, but rather discloses that the pumps, control levels and control speeds are selected in such a manner as to ensure that the starting pump outflow exceeds the average inflow. This is distinguishable from the invention as claimed wherein operating points are selected around a system setpoint based upon the performance characteristics of a plurality of other components in the system.

Further, the Examiner asserts that col. 1, lines 42-45, intimates: *automatically controlling the system according to the desired operating point*. However, col. 1, lines 42-45 states: "The control apparatus and methods used in pumping stations are generally focused on maintaining desired operating conditions reliably, but without specifically addressing or even calculating operating efficiencies and/or costs." From the foregoing quotation it is apparent the control apparatus and method disclosed in Irvin does not *automatically control* the system according to the desired operating point, but rather *maintains* operating conditions. According to The American Heritage College Dictionary (3rd ed 1993), *controlling* has the following connotation: "control -trolled, -trolling, -trols 1. To exercise authoritative or dominating influence over; direct. . . 3.a. To verify or regulate . . . by comparing with another standard." *Id.* at 303. On the other hand, according to The American Heritage College Dictionary (3rd ed 1993) *maintain* is defined as:

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maintain -tained, -taining, -tains. 1. To keep up or carry on; continue. 2. To keep in an existing state; preserve or retain. 3. To keep in a condition of good repair or efficiency. 4.a. To provide for; support. b. To keep in existence; sustain. 5. To defend or hold against criticism or attack. 6. To declare to be true; affirm. *Id.* at 817-818.

Thus, it is apparent the system provided by Irvin rather than *automatically controlling* or regulating the system around a desired operating point, simply keeps, i.e. *maintains*, machine performance at a single static operating point.

In view of at least the foregoing, it is believed that independent claim 1, and associated dependent claims, is in condition for allowance, and that this rejection should be withdrawn.

II. Rejection of Claims 40-42 Under 35 U.S.C. §102(e)

Claims 40-42 stand rejected under 35 U.S.C. §102(e) as being anticipated by Hays *et al.* (US 6,260,004). This rejection should be withdrawn for at least the following reasons. Hays *et al.* does not teach or suggest all the limitations set forth in the subject claims.

Independent claim 40 recites *a diagnostic component operatively connected to the pump to diagnose an operating condition associated with the pump; wherein the controller provides the control signal to the motor drive according to a setpoint and a diagnostic signal from the diagnostic component according to the diagnosed operating condition in the pump.* It is apparent that the invention as claimed relates to a controller that provides a control signal to a motor drive to operate a motorized pump in a controlled fashion. The controller comprises a diagnostic component to diagnose the operating conditions of a pump connected to the diagnostic component. The controller utilizes the diagnosed operating conditions received from the diagnostic component to provide a control signal to the motor drive according to a setpoint and the received diagnosed operating condition. Hays *et al.* is silent regarding these novel features of the claimed invention.

Hays *et al.* discloses a method and apparatus for diagnosing a pump system. The Examiner asserts that Hays *et al.* discloses a controller for providing a control signal to a

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motor drive to operate a motorized pump in a controlled fashion, as set forth in the preamble of the subject claim, at col. 1, lines 39-47 and col. 6, lines 54-57. Contrary to the Examiner's assertions, col. 1, lines 39-47, suggests vibration *monitoring* equipment rather than a *controller* that provides a control signal to a motor drive to operate a motorized pump in a controlled fashion, and col. 6, lines 54-57, which states: "[t]he driver source is typically an electric motor, diesel engine or turbine, and the driver source controller is typically a motor control system or variable speed drive and measurement devices for key process and equipment monitoring variables," fails to provide a control signal to the motor drive to operate the motorized pump in a controlled fashion.

The Examiner further contends that Hays *et al.* discloses the substance of the subject claim at lines 1-3 of the abstract, and col. 10, lines 39-43. Lines 1-3 of the abstract state: "[a]n apparatus and method for diagnosing rotating equipment commonly used in the factory and process control industry are provided", and col. 10, lines 39-43 states: "b) diagnosis of change in an operating condition of pump and motor system 10 for purposes of maintenance and for changing the operation and control of pump and motor system." Neither lines 1-3 of the abstract nor col. 10, lines 39-43, disclose a diagnostic component operatively connected to the pump to diagnose an operating condition associated with the pump *wherein the controller provides the control signal to the motor drive according to a setpoint and a diagnostic signal* from the diagnostic component according to the diagnosed operating condition in the pump. Thus, Hays *et al.* fails to teach or suggest any of the limitations set forth in the subject claim. Accordingly, in view of at least the foregoing, withdrawal of this rejection with respect to independent claim 40, and dependent claims 41-42, is respectfully requested.

III. Rejection of Claims 5, 7-9, 11-20 and 23-36 Under 35 U.S.C. §103(a)

Claims 5, 7-9, 11-20 and 23-36 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Irvin (US 5,742,500) in view of Crane (US 4,584,654). This rejection should be withdrawn for at least the following reasons. Neither Irvin nor Crane, alone or in combination, teach or suggest each and every limitation set forth in the subject claims.

To reject claims in an application under §103, an examiner must

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establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) *must teach or suggest all the claim limitations*. See MPEP §706.02(j). The *teaching or suggestion to make the claimed combination* and the reasonable expectation of success *must be found in the prior art and not based on the Applicant's disclosure*. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added).

Independent claims 23, 34 and 35 recite similar claim limitations: *a motor drive providing electrical power to the motor in a controlled fashion according to a control signal and a controller providing the control signal to the motor drive according to a desired operating point within an allowable range of operation about a process setpoint*. In particular, applicants' claimed invention communicates the control signal to the motor drive and thereupon the motor drive provides electrical power in a controlled fashion to the motor; there is no human intermediary to facilitate actuation of the motors. Neither Irvin nor Crane discloses such a feature.

As the Examiner concedes, Irvin fails to teach or suggest providing a control signal to a motor drive in a controlled fashion according to a control signal. Thus, the Examiner attempts to utilize Crane to make up for the deficiencies presented by Irvin. However, Crane discloses a *monitoring* system and method, rather than a method and system to *control* a motor drive *according to a desired operating point within an allowable range of operation about a process setpoint*. Crane utilizes human intermediaries, e.g. an operator to monitor the operation of all pumping stations from a centralized location. See, col. 7, lines 45-46. It is therefore apparent that Crane does not go beyond monitoring the pumping system using human intermediaries to actuate the machinery in the pumping system in response to the monitoring facility. This is clearly distinguishable from a control system that utilizes a motor drive to provide electrical power to a motor in a controlled fashion based on a control signal, the control signal based upon a desired operating point which itself is based upon an allowable range of

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operation around a process setpoint. Accordingly, in view of at least the foregoing, it is submitted that this rejection should be withdrawn with respect to independent claims 23, 34 and 35, as well as to those claims that depend therefrom. Further, as has been stated *supra*, since it is believed that independent claim 1 is in condition for allowance, withdrawal of the rejection with respect to claims 5, 7-9 and 11-20, that depend from independent claim 1, is also respectfully requested.

IV. Rejection of Claims 37-39 Under 35 U.S.C. §103(a)

Claims 37-39 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Irvin (US 5,742,500) in view of Hays *et al.* (US 6,260,004). Withdrawal of this rejection is requested for at least the following reasons. Irvin and Hays *et al.*, either alone or in combination, fail teach or suggest all the limitations set forth in the subject claims.

Independent claim 37 recites *a pump control system for automatically operating a pump driven by a motor in a controlled fashion, comprising: a motor drive providing electric power to operate the motor in a controlled fashion according to a motor control signal; and a controller comprising a diagnostic component operatively connected to diagnose an operating condition associated with the pump; wherein the controller provides the control signal to the motor drive according to a setpoint and a diagnostic signal from the diagnostic component according to the diagnosed operating condition in the pump.*

The Examiner contends that Irvin at col. 1, line 49 and col. 1, lines 23-25 and figure 1, discloses a pump control system that automatically operates a pump drive by a motor in a controlled fashion that comprises a motor drive providing power to operate the motor in a controlled fashion. Applicants' representative asserts to the contrary. Col. 1, line 49, provides: "If the pump has a variable-speed drive," and col. 1, lines 23-25, discloses: "... power input to the system or to individual pump motors, and other operating parameters. There may be one or more check valves in parallel or in series within each pump." As is evident, the indicated passages of Irvin fail to teach or suggest *a pump control system for automatically operating a pump driven by a motor in a*

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controlled fashion, comprising: a motor drive providing electric power to operate the motor in a controlled fashion according to a motor control signal.

The Examiner further concedes that Irvin further fails to disclose *a controller comprising a diagnostic component operatively connected to diagnose an operating condition associated with the pump*, and thus seeks to rely on Hays *et al.* stating:

Hays *et al.* discloses a controller comprising a diagnostic component operatively connected to diagnose an operating condition associated with the pump; where in the controller provides the control signal to the motor drive according to a setpoint and a diagnostic signal from the diagnostic component according to the diagnosed operating condition in the pump (see abstract, lines 1-3 and col. 10, lines 39-43). Final Office Action dated April 5, 2004, page 15.

However, as has been argued in connection with the rejection of claims 40-42 above, Hays *et al.* fails to teach a diagnostic component operatively connected to the pump to diagnose an operating condition associated with the pump *wherein the controller provides the control signal to the motor drive according to a setpoint and a diagnostic signal* from the diagnostic component according to the diagnosed operating condition in the pump.

In view of at least the foregoing it is respectfully requested that the rejection of independent claim 37, and claims that depend therefrom, should be withdrawn, and the subject claims be placed in condition for allowance.

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CONCLUSION

The present application is believed to be in condition for allowance in view of the above comments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063.

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number below.

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